

the smallest ground for the assertion that sexual excesses ever produce it.

**Course.**—The course in general is the following: After the patient has for weeks and months managed with difficulty to get around, his legs becoming weaker and weaker, he has to take to bed or to the rolling chair, where he spends one, two, even four years, harassed by various afflictions, among which the bladder symptoms and the motor disturbances are especially prominent. Recovery, if it occurs at all, is only very exceptional, and the prognosis must therefore always be very

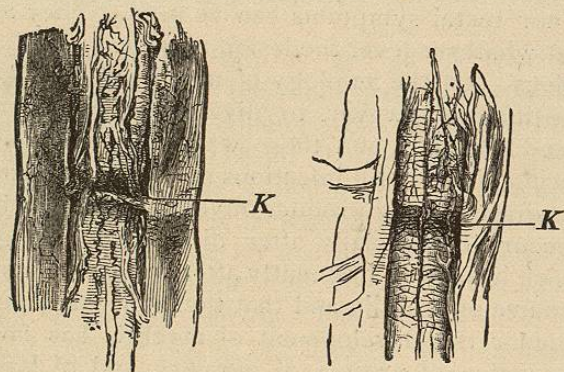


Fig. 145.

Fig. 146.

COMPLETE INTERRUPTION OF CONDUCTION OF THE SPINAL CORD DURING LIFE. Fig. 145, anterior, Fig. 146, posterior aspect of the spinal cord. The dura mater is divided and folded back. Circular compression and narrowing of the spinal cord at *K* in consequence of carcinoma of the vertebrae in a woman thirty-four years of age. Natural size. The drawing is made from a fresh preparation. (After EICHHORST.)

unfavorable. Death occurs in consequence of bed-sores, which are seldom absent, or is at least precipitated by them. Some patients die from intercurrent diseases, others from the cystitis. The course of the so-called pressure myelitis and its resulting pressure paralysis, the symptoms of which have before been alluded to on page 424, is so far characteristic that we can here distinguish a prodromal stage, a stage of irritation, and a stage of paralysis. The prominent features of the first are rigidity of the vertebral column, dull, vague pains in the back, and the first signs of a commencing deformity. In the second stage we have severe neuralgic pains, hyperæsthesias, paræsthesias, and girdle sensations. In the third, finally, paralytic symptoms, increased reflexes, vaso-motor and trophic disturbances (herpetic eruptions, muscular atrophies, bed-sores, etc.).

This distinction, however, is only possible in isolated cases. Bladder and rectal symptoms are absent in no case of pressure paralysis.

In our prognosis we must not leave out of consideration the possibility that the inflammatory new formations in the vertebræ may disappear, and thus, the cause which produced the break in the conduction ceasing to act, it may be possible for the spinal cord to recover completely all its normal functions, provided, of course, that none of the nerve elements have been destroyed.

**Treatment.**—The treatment of any case of myelitis necessitates much patience on the part of the sufferer, because weeks and months may pass before any sign of improvement can be perceived, and much circumspection on the part of the physician, because we are never able to say beforehand how certain measures are going to be borne by the patient, and because what often helps one is harmful to another; hence one must proceed carefully and systematically, and as it is likely that the course of the disease is going to extend over years, one should always have something new and as yet untried in reserve. If the diagnosis has once been made with certainty, it is our duty to inform the patient in a delicate way of the true state of affairs, and how seriously his capacity for following his occupation will be interfered with; further, to see that he is properly fed on a nourishing diet, and obtain for him as far as possible mental and bodily rest. It is a gross error to recommend such patients, who are easily fatigued and who on the slightest provocation are attacked by all sorts of pains, to take as much exercise as possible, or even to prescribe gymnastics for them.

The electrical treatment is indicated and ought to be begun early. The constant current should be applied near the seat of the lesion (the anode being placed on the tender parts of the spinal column if there be such), the faradic to the peripheral parts, especially the lower legs. Definite rules can not be laid down. It is best to seek information from a reliable text-book, and to try which mode of treatment is best borne by the patient and by which most is accomplished. Tepid baths—84° to 88° Fahr.—three or four times a week for from fifteen to thirty minutes, best taken in the forenoon, usually have a favorable influence, and are, if not of lasting benefit to the patient, frequently productive of at least a transient feeling of comfort.

The addition of rock-salt, sea-salt, or lye (one or two quarts) should only be ordered if the patient himself seems to lay much stress on it, as we can not expect any especial effect from them. Neither should we raise our expectations too high when we recommend warm brine baths containing carbonic-acid gas, or non-medicated warm baths, or mud baths and the like. Of course every patient, rich or poor, expects us to send him in summer to the springs, but he will gradually find out that the success attained does not compensate for the expense and the trouble which the yearly course at such places entails, and that it is wiser to remain in his comfortable home or to betake himself into the country and enjoy the mountain or forest air in some place where he can live in peace. The life in modern watering-places is not adapted for a patient with myelitis. Mild cold-water treatment in an intelligently conducted sanitarium (Graefenberg, Nassau, Elgersburg, and others) may well be recommended. All internal medicines (strychnine, silver, ergotine, iodide of potassium, etc.) are of no avail. The treatment of the retention of the urine and the consequent cystitis must be carried out according to strict surgical principles. In the treatment of a compression myelitis we must not forget the necessary extension apparatus, braces, etc., for the vertebral column. These means, however, belong to the domain of orthopædic surgery.

Sometimes the effect of a unilateral section of the spinal cord, where we consequently again have a lesion of the gray as well as the white matter, can be observed in those rare instances in which traumatism, a tumor, or the like, has rendered the half of the cord incapable of performing its functions. The clinical picture resulting from such a lesion is much more rarely observed than we should be led to suppose from the accounts in the text-books. The disease is called Brown-Séquard's spinal paralysis. It, in short, manifests itself as a motor paralysis on the side of the lesion, and a sensory paralysis on the opposite side. This is explained by the distribution of the fibres, inasmuch as the sensory fibres cross over to the other side soon after their entrance into the cord, while the motor fibres pass upward to the medulla oblongata without crossing (cf. Fig. 147); thus, if, for instance, the lesion be in the right half of the lumbar cord, a paresis of the right leg ensues, while the left is anæsthetic; if the lesion is high up in the right half of the

cervical cord, the right arm and right leg are paralyzed ("spinal hemiplegia"), and the other half of the body is anæsthetic. The fact that on the side on which there is motor paralysis there is often a hyperæsthesia (Kiver has reported a case in the *Neurol. Centralbl.*, 1891, No. 2, in which there was no hyperæsthesia) for certain qualities of sensation—with the exception of the muscular sense, which appears diminished—is explained, according to Brown-Séquard, by the fact that the fibres for the muscle sensibility do not cross over as the other sensory fibres. Above the hyperæsthetic there is an anæsthetic zone, due to the destruction of the posterior nerve roots. Further, there is an increase of the reflexes on the side affected with motor paralysis, owing to the cutting off of the inhibitory influence, as well as a vasomotor paralysis, manifesting itself by an elevation of temperature. On the anæsthetic side the reflexes are normal; a narrow hyperæsthetic zone (on the trunk) is here also noticeable above the area of anæsthesia.

On the whole, the descriptions which we possess of unilateral cord lesions are of no great practical use, because, as has been stated, the clinical picture just described is but rarely distinct and complete, and may present all kinds of variations (cf. Hoffmann, *Deutsch. Arch. f. klin. Med.*, 1886, 38, 6, where three cases of this class which occurred in Erb's clinic are described).

## LITERATURE.

- Peabody. *New York Medical Record*, February 5, 1883, xxiii.  
Charpentier. *Revue d'hyg.*, March 3, 1883, v.  
Barlow. *Lancet*, November 20, 1886, ii. (Myelitis after Measles.)

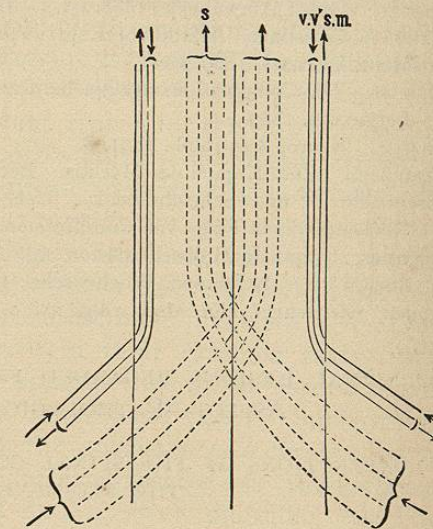


Fig. 147.—SCHEMA OF THE COURSE OF THE NERVE FIBRES IN THE SPINAL CORD. *z*, uncrossed motor fibres. *v*, uncrossed vasc-motor fibres. *sm*, uncrossed fibres for the muscular sense. *s*, decussating sensory fib.es. (After BROWN-SÉQUARD.)

- Grasset et Estor. Myélite cervicale. *Revue de méd.*, 1887, vii, 2.  
 Schütz. *Prager med. Wochenschr.*, 1887, xii, 38. (Cure of Myelitis.)  
 Cramer. *Arch. f. Psych. u. Nervenkrankh.*, 1888, xix, 3, p. 667.  
 Kröger. *Beiträge zur Pathologie des Rückenmarkes.* (Recovery from Compression Paralysis.) Dorpat, 1888. Inaug.-Dissert.  
 Gessner. *Arch. f. Augenheilk.*, 1888, xix, 1. (Myelitis Acuta after Loss of Blood.)  
 Herter, A. Christian. A Study of Experimental Myelitis. *Journ. of Nerv. and Ment. Diseases*, 1889, xiv.  
 Schmaus. *Die Compressionsmyelitis bei Caries der Wirbelsäule.* Wiesbaden, Bergmann, 1889.  
 Schaffer. *Neurol. Centralbl.*, 1891, 8.  
 Oppenheim. Zum Kapitel der Myelitis. *Berliner klin. Wochenschr.*, 1891, 31.  
 Rosenbach, P. und Schtscherback. Ueber die Gewebsveränderungen des Rückenmarks in Folge von Compression. *Virch. Arch.*, lxxii.  
 Eulenburg. Spinale Halbseitenläsion mit cervico-dorsalem Typus nach Influenza. *Deutsche med. Wochenschr.*, 1892, 38.  
 Leyden. *Zeitschr. f. klin. Med.*, 1892, xxi, 1, 2, 5, 6.

## II. SPINAL LESIONS REGARDED FROM THEIR PATHOLOGICAL ASPECT—PATHOLOGICAL DIAGNOSIS.

### I. AFFECTIONS OF THE SPINAL CORD DUE TO DISEASES OF THE BLOOD-VESSELS.

#### A. Diseases of the Arteries of the Spinal Cord and their Consequences.

The vertebral arteries which arise from the subclavian, and which unite to form the single basilar artery, give off, after having entered the skull, an anterior spinal and a posterior spinal artery by which the spinal cord is supplied with blood. The anterior spinal arteries of both sides unite to form a vessel which runs along the spinal cord in the anterior spinal fissure, while the posterior spinal arteries anastomose freely with each other without, however, completely uniting; the horizontal branches run along the septa. White and gray matter are nourished in the same way, but the capillary network of the latter is much denser than that of the white substance.

The venous blood is collected into two fairly large veins, which are called the central veins of the spinal cord. They anastomose freely among themselves, and are connected with the anterior and posterior spinal veins. From them the venous blood passes into the vertebrals, which empty into the innominate or the subclavian vein. About the diseases of the spinal veins up to the present nothing is known.

#### 1. Spinal Hæmorrhage—Hæmorrhagia (or Apoplexia) Medullæ Spinalis—Hæmatomyelia.

While, as we have shown above, a primary hæmorrhage from the cerebral vessels is one of the most common causes

of lesions of the brain, spontaneous hæmorrhages from the spinal arteries are exceedingly rare, and indeed it seems hardly possible that a hæmorrhage could take place into the substance of the cord, so firmly held together as it is by the tough pia mater, without the previous existence of alterations in its consistence; besides, the anatomical conditions of the arteries are such that the blood pressure is decidedly lowered before the blood wave reaches the spinal cord; furthermore—and this is perhaps the most important reason for the rare occurrence of hæmorrhage into the cord—miliary aneurisms, which in the brain are the most frequent source of hæmorrhage, are never found here. For these reasons the existence of primary spontaneous spinal hæmorrhages has been absolutely denied, and it has been assumed that in every case changes in the consistence of the cord substance must have preceded. We fully agree with those who believe in their extreme rarity, but, nevertheless, we are of the opinion that under certain conditions primary hæmorrhages actually do occur. Such conditions are: (1) in old persons the coexistence of cerebral hæmorrhages in consequence of arterial disease; (2) the presence of such ætiological factors as excessive muscular exertion (heavy lifting, cutting wood, etc.); (3) the sudden and violent suppression of hæmorrhages in other places (the menses, hæmorrhoids, etc.); (4) the exposure to a sudden marked diminution of atmospheric pressure, as happens to those who follow certain occupations, as, for instance, workers in compressed air in building bridges or winning amber (cf. Hirt, *Gewerkrankheiten im Handbuch der spec. Pathologie und Therapie*, vol. i, third edition, reprint, pp. 83 *et seq.*).

The pathological condition is either one of capillary hæmorrhages or of a hæmorrhagic infiltration in which the escaped blood extends between the nerve fibres along the course of the vessels, or finally we have hæmorrhagic foci, in which the blood coming from the vessels in larger quantities presses the nerve tissue apart and forms a sort of cavity. The focus usually extends in the longitudinal direction of the cord. Hæmorrhage may occur at any level of the spinal cord and in any portion of the cross-section, and may produce the same changes in its substance as cerebral hæmorrhage produces in the brain—changes with which we have become familiar in a previous chapter.

Clinically, spinal apoplexy is characterized by paralysis with a sudden onset, sometimes attacking the patient without